

January 5, 2000

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Dear Mr. Helliker and Mr. Kenny:

First, I want to thank you for attending the November Scientific Review Panel (SRP) meeting. Your presence was important and will facilitate the ongoing interaction between the SRP and DPR.

In the November 1999 meeting, the SRP adopted findings and recommendations specifically relating to how pesticides are selected as candidates for consideration as toxic air contaminants, and how air monitoring is conducted for those candidates. Enclosed with this letter are the Panel's findings and recommendations for your consideration.

Two workshop sessions held on September 16-17, 1999 were designed to provide the Panel with background information needed for its scientific review of risk assessments for pesticides under its statutory mandate. Invited speakers and presentations by your respective staffs responded to questions posed by the Panel and these formed the basis for the program (see enclosed workshop outline).

The aims of the prioritization session were to delineate the criteria used by the Department of Pesticide Regulation (DPR) in ranking pesticides for entry into the AB 1807 toxic air contaminant process, how often that ranking is updated, the status of current high priority pesticides, and how the AB 1807 program is coordinated with other programs within DPR. The aims of the monitoring session were to clarify current approaches to monitoring ambient air concentrations of pesticides and to discuss proposed changes being considered jointly by your departments.

I know that the Panel was enthusiastic about the discussions that occurred during the workshops and, as noted in our findings, we are hopeful that these recommendations can contribute to an improved process for identifying pesticide toxic air contaminants. If requested I am prepared to appoint Panel member leads or a technical liaison to assist in the implementation of any of the recommendations made here. I have asked Dr. Elinor Fanning to work with your

staff to address questions and issues relating to the workshop findings. She will be available on an ongoing basis.

I want to express my appreciation to your staffs for their contributions to the proceedings during the past year, and as we look ahead to the new year. I look forward to working with you on these important matters.

Sincerely,

S/

John R. Froines, Ph.D.
Chairman
Scientific Review Panel

Enclosures

cc: Scientific Review Panel members
Joan Denton, Ph.D., Director, Office of Environmental
Health Hazard Assessment
Paul Gosselin, DPR
Jim Behrmann, ARB
Elinor Fanning, UCLA

Workshops on pesticide toxic air contaminants:
Findings and Recommendations of the Scientific Review Panel
(Adopted November 17, 1999)

Background

The Scientific Review Panel has been inviting guest speakers and holding workshops on an ongoing basis to address scientific and methodological issues related to the identification of pesticides as toxic air contaminants (TAC) in California. The general purpose of this program of seminars and workshops is to provide the Panel with background information needed for its scientific review of risk assessments on pesticides. On September 16th and 17th, 1999, two workshop sessions were held (see attached program, Appendix 1):

Part A: Prioritization of pesticide toxic air contaminant candidates

Part B: Air monitoring for pesticides

The aims of the prioritization session were to clarify for the Panel the process by which the Department of Pesticide Regulation (DPR) prioritizes pesticide TAC candidates for development of TAC risk assessment documents. Specifically, the workshop was intended to delineate the criteria DPR uses in prioritization, how frequently the priority list is updated, the

status of current high priority substances, and how prioritization of pesticides for risk assessment under the TAC (AB1807) and the Birth Defects Prevention Act (SB950) programs is coordinated at DPR. In addition, the status of pesticide risk assessments at the Federal level was presented by an invited speaker from the Office of Pesticide Programs of the US EPA.

The aims of the monitoring workshop were to clarify for the Panel the current approach to air monitoring of pesticide TAC candidates, and to discuss the proposed changes to the monitoring plan that are under consideration by a team from the Air Resources Board (ARB) and DPR. Available technology for concurrent sampling for multiple pesticides, scenarios in which multiple chemical sampling might be economically and/or scientifically advantageous, and the limitations to the methods were also discussed. Two guest speakers presented on the topics of “Estimating airborne exposures to agricultural chemicals” (Dr. Robert Spear from the University of California, Berkeley) and “Sampling ambient air for pesticide residues” (Dr. Michael Majewski from the USGS), providing scientific framework for discussion. Current and proposed strategies for monitoring were discussed with the goal of identifying ways to increase the efficiency of the exposure assessment portion of TAC candidate risk assessments.

The Panel found the presentations by invited experts and agency staff from ARB and DPR helpful and informative. This report summarizes the Findings of the Panel resulting from each workshop session and proposes recommendations on pesticide prioritization and air monitoring for the consideration of DPR and ARB.

Part A: Prioritization of pesticide toxic air contaminant candidates

Findings of the Panel:

1. DPR’s prioritization method for AB 1807 (developed in EH96-01) has had limited use; prioritization for the SB950 program has overshadowed AB1807 prioritization:

DPR staff explained that the ranked list of pesticides reported in a prioritization document developed in 1996 for the AB1807 program (EH 96-01) has not been a primary determinant for initiating risk assessments of pesticides (9/16 p. 43 L 20 – p. 45 L 12). Because DPR has to integrate the demands for risk assessments of pesticides under at least three different programs (the Birth Defects Prevention Act SB950 and the Food Safety Act, 2161, in addition to the TAC program). However, the Department has relied on prioritization of pesticides for SB950 to guide overall risk assessment activity (9/17 p.127 L 7-13; p.132 L 23 – p.133 L 4).

2. The criteria used to prioritize for SB950 differ from those articulated by DPR in the prioritization document for 1807 (EH96-01); prioritization under SB950 does not necessarily reflect the likelihood a pesticide is a TAC:

The SB950 prioritization list is updated frequently by the Adverse Effects Advisory Panel, consisting of scientists from DPR and from the Office of Environmental Health Hazard Assessment. This panel groups pesticides into high, medium and low priority categories (9/16 p. 26-29) based primarily on toxicity data (9/16 p. 22 L 5), but also on level of use (9/17 p. 125 L 11-15). Pesticides are not further ranked within these priority groups, and a quantitative approach beyond the high, medium and low hierarchy is not used. Prioritization for SB950

purposes does not necessarily reflect likelihood of being a TAC. For example, volatility or other indicators of the likelihood a pesticide is present in air are not considered in developing the high priority group of pesticides for SB950 risk assessments.

3. The process used to select pesticides for active risk assessment at DPR has not been clearly articulated and has not generally taken TAC candidate status into account:

Of the 70 or so pesticides in the SB950 high priority category, DPR has staff resources to carry out risk assessments for only a small number each year (9/17 p.135 L 24 – p. 136 L1).

Therefore, the decision to initiate risk assessment for particular pesticides is a critical element of DPR's overall program. Initiation decisions are made by senior staff in the Medical Toxicology and Worker Health and Safety branches; the process not appear to be guided by a coherent policy approach (9/16 p.28 L 24 – p.29 L 12; 9/17 p.134 L 10-17; 9/17 p. 143 L 5-20). Priority ranking under AB1807 has not, in the past, played a role in initiation (9/17 p. 132 line 23 – p. 133 line 19). See further comments and specific cases below, in finding #4.

4. The process used to select pesticides for air monitoring has been disconnected from risk assessment initiation: (Note: this finding and the next are relevant to both Part A and Part B of the workshop)

It was not clear from the workshop proceedings how pesticides are selected for monitoring. DPR's requests to ARB for air monitoring of pesticides have not been coordinated with scheduling evaluation of health effects for risk assessment (p. 33 L 15-18; and *handouts from DPR and ARB staff*). AB1807 documents have at times been generated by comparing the list of completed SB950 risk assessments to a separate list of monitoring data and identifying those pesticides for which both were available (9/16 p. 33 lines 8-18 and p. 40-41 lines 18-6; 9/17 p.133 L5-19). DPR staff indicate they are now working to link the process of initiating risk assessment with monitoring requests to improve coordination. In this regard, the Panel notes that materials prepared by DPR staff identified "no toxicological activity" at DPR on propargite. This active ingredient was ranked as the number one priority in 1996, and is a probable human carcinogen for which a monitoring report is currently being completed (*handouts from DPR staff*). This means that monitoring was originally requested for propargite in 1994, but risk assessment of propargite has yet to be "initiated". Similarly, dimethoate (#13) and simazine (a possible carcinogen ranked #20) were listed on recent monitoring requests, but do not appear to be under way for risk assessment. Linuron (a possible carcinogen ranked #16) has monitoring data available resulting from a 1994 request, but risk assessment for linuron has not yet been initiated.

5. DPR's request for pesticides to be monitored in 2000 better reflects TAC priorities than past requests:

Pesticides selected for monitoring by DPR have not always been TAC priorities. For example, according to the monitoring recommendation submitted to the Panel for the workshop, bifenthrin has low volatility and decreasing use due to pest resistance. Yet the Panel found that bifenthrin was one of six pesticides DPR asked ARB to monitor in 1999. Pesticides ranked 6, 12, and 13 in EH 96-01 had not yet been monitored when the request was prepared. In contrast, Ziram, (#106) completed monitoring in 1994, and DPR requested monitoring of paraquat (#61) for 2000. The Panel found that DPR's monitoring request for 2000 reflects AB1807 priorities better than some past requests. The list for 2000 includes three pesticides given high priority for AB1807

(alachlor, dimethoate and benomyl, # 12, 13 and 21 respectively), two HAP-TACs (the Hazardous Air Pollutants carbaryl and maneb), two pesticides that have moderate priority for AB1807 (paraquat and phosmet, #50 and 61), and two pesticides that were not considered in the 1996 prioritization (tralomethrin, and methamidophos).

6. The changing use patterns of pesticides have not been incorporated into AB1807 prioritization in a timely manner:

As cited above in finding #5, some pesticides currently being considered for air monitoring have not yet been prioritized under AB1807. Pesticide use patterns can change from year to year, and this is not adequately addressed by the policy of updating EH96-01 every four years.

7. DPR does not routinely consider USEPA pesticide risk assessments as possible groundwork for DPR's TAC risk assessments:

The Panel heard from a guest speaker that, in their process for tolerance reassessment under the Food Quality Protection Act, USEPA has completed assessments of a number of organophosphates. These documents can be made available to DPR (9/16 p. 69 lines 18-22). DPR staff indicated that USEPA's pesticide risk assessments could provide the foundation for TAC listing documents, but that the exposure assessment portion of a TAC document has to be California-specific (9/16 p. 75-76 lines 22-9). There is not yet a policy at DPR concerning the use of USEPA risk assessments, but it appears that these documents could accelerate the pace of risk assessment for some TAC candidates.

Recommendations of the Panel:

1. Update EH96-01 on an annual basis:

The Panel supports the proposal made by DPR staff (9/17 p. 148 lines 9-13) to begin an update of the prioritization document for AB1807. The Panel recommends the following changes be incorporated into the updated version:

- Schedule updating annually, rather than every four years. The resulting priority list would be published, as was the 1996 list. For most pesticides, updating the priority list may be accomplished by including the most recent Pesticide Use Report data. However, the annual priority list would also be updated to incorporate new toxicology data as it becomes available, particularly data that could alter the safe exposure level or the identification of the compound as a carcinogen or developmental/reproductive toxicant. Further, newly registered pesticides should be added to the annual update.
- Consider both current use patterns and recent trends in use in the prioritization. This will facilitate the review of active ingredients for which use is increasing in California.
- Consider increasing the weight given to oncogenicity in the ranking scheme. For example, iprodione, is listed as a carcinogen under California's Safe Drinking Water and Toxic Enforcement Act, but is ranked at #66 in EH96-01.
- In producing a ranked list, it may be preferable to assign the same rank to those pesticides that receive identical prioritization scores.

2. Consider a batched approach for listing of high priority organophosphates:

The Panel recommends a batched, expedited review for cholinesterase-inhibiting organophosphate pesticides that are: 1) ranked in the top 40 by DPR's updated prioritization and 2) have tolerance reassessment documents available from USEPA. Because many of these pesticides have related mechanisms of action, it would be more efficient for the Panel to consider them as a group. Batch 1 could consist of those pesticides for which ARB has completed monitoring and therefore TAC documents could be completed rapidly if given a high priority for staff time. Batch 2, the remainder, would be submitted to ARB for application site monitoring (see monitoring recommendations below) and brought to the Panel for review after the exposure assessments are complete. (*see 9/17 p.146 L 23 – p. 147 L 11*).

3. In place of the current *ad hoc* process used to determine initiation of risk assessments, DPR needs a clear policy and ranking process to coordinate the priorities of all programs that require DPR to prepare risk assessments for pesticides:

The Panel recognizes that DPR is required to do risk assessments of pesticides under several different statutes, and that there is a need to balance the priorities of each program. However, the workshop presentations made clear that risk assessments for the Toxic Air Contaminant program have been placed at lower priority than those for other programs. The statute states:

The director shall give priority to the evaluation and regulation of substances based on factors related to the risk of harm to public health, amount or potential amount of emissions, manner of usage of the pesticide in California, persistence in the atmosphere, and ambient concentrations in the community. (California Food and Agricultural Code, Division 7, Chapter 3, Article 1.5, Section 14022 (e)).

The current process for initiating risk assessment does not appear to fulfill these requirements. For example, atmospheric persistence and volatility are not considered under the current process which focuses on SB950 program needs. The Panel recommends that a policy be developed to address integration of the mandates of the various programs that require DPR to do risk assessment for pesticides. This policy should clearly state how the prioritization for each program may differ (e.g. dietary intake is not a factor in the TAC program, volatility and atmospheric persistence are not factors for SB950, etc) and how the priorities of each program can be represented in the overall order in which pesticides risk assessments are initiated and completed at DPR. The policy should clearly delineate criteria for ranking that would replace the current *ad hoc* procedure with an explicit and transparent process. The updated AB1807 prioritization should be used to represent the priorities of the TAC program in the integrated initiation process (*9/17 p.147 L15- p. 148 L 8*). DPR staff expressed interest in making initiation plans public (*9/17 p.148 L9-13*); the Panel agrees.

4. Improve coordination of monitoring requests with risk assessment priorities and initiation of risk assessments:

There is clearly a need for improved coordination in the timing of work on health effects assessments and exposure assessments for TAC candidates. The Panel recommends that at the time risk assessment for a pesticide on the 1807 priority list is initiated, a request for monitoring should be submitted to ARB. This linkage should help to ensure that all the parts of TAC listing documents can reach completion in the same time frame.

5. Address DPR's need for additional resources including additional toxicology staff for AB1807:

Limited staff time was identified as an important factor in the historically slow pace of listing pesticides. The Panel recommends that DPR seek additional resources to facilitate the timely completion of AB1807 listing documents. Of 35 pesticides for which monitoring is completed, risk assessments still need to be developed for over half (*p. 60 L 25 – p. 61 L 9*). Risk assessment for toxic air contaminants that are listed due to their status as hazardous air pollutants is an additional area of need for more staff time.

Part B: Air Monitoring for Toxic Air Contaminant Candidates

Findings of the panel: (citations for this section pertain to the 9/17/99 transcript.)

1. Monitoring reports require from 1.5 to 2.5 years to complete:

The time from receipt of a monitoring recommendation from DPR to completion of the ARB report is generally 18 months; in some cases there are delays (*p.13, L 8-11*). The period between a DPR recommendation and a final report is a function of: 1) the time between receipt of the recommendation and the high use period when monitoring can occur (a few months up to a year), 2) method development (one to a few months), 3) sampling (up to two months), 4) analysis (one to two months), and 5) report preparation and review (several months) (*p.12 L 13-19*).

2. Monitoring has been completed for many pesticides ranked high priority for AB1807:

The Panel learned that, to date, DPR has requested monitoring for 48 pesticides. DPR staff explained that following an initial request for monitoring to ARB, a detailed monitoring recommendation is developed by DPR. Out of the 48 pesticides, monitoring recommendations have been submitted to ARB for 42. Monitoring recommendations are pending for the remaining six pesticides, which were requested for 2000-2001. In response, ARB has submitted final reports on 35 of the 42 pesticides to DPR. Six reports are in preparation, and for the one remaining, monitoring has just concluded (*p.54 L 23 – p. 55 L 14*). DPR's request for next year asks for monitoring of 9 pesticides, and 5 breakdown products. (*p.11, L 7-9*). The specific products to be monitored for 2000 were discussed above, as part of the prioritization session (Finding #5, under Prioritization).

3. Ambient monitoring data may not occur during application of the pesticide of interest:

ARB staff and invited experts discussed with the Panel several challenges associated with ambient monitoring, including the difficulty of correlating the measurements taken with actual application events, and the usefulness of the resulting data (*pp. 22-34*). The most important finding of the Panel was that field staff doing ambient monitoring do not know for sure that the pesticide of interest will be applied during the sampling period (*p.22 L 4-8 and L 21-25*). This is, in part, because growers/farmers in the area of interest are not generally consulted as part of the planning process for ambient monitoring (an example was given: *p.23 L 14-19*). Data from the Pesticide Use Reports (PUR) are used to predict when and where a pesticide will be applied based on historical use patterns. However, at this time the PUR is not routinely consulted after

monitoring has occurred to learn what applications actually occurred in the monitored area during the sampling period. Panel members also asked whether the siting criteria offer guidance about what proximity to known applications is preferable (*p.19 L 19 – p.20 L 3*). Meteorological data are not currently used to characterize results of ambient sampling, although such data would be obtainable by ARB staff (*p.30 L4-6*).

4. Ambient monitoring may not result in a useful characterization of population exposure:

Another critical concern about ambient monitoring for pesticides was raised by Dr. Robert Spear, the invited expert from the University of California. The distribution of pesticide exposures to people in agricultural areas is likely to be highly variable, likely ranging over two to three orders of magnitude (*p.90 L 2 – p. 91 L 6*). The wide variability in individual exposure levels results in part from the variability in time and space of source emissions (pesticide applications), and in part from differences in time-activity patterns of the people at risk. Dr. Spear concluded that, due to extensive inter-individual variability in pesticide exposures through ambient air, ambient monitoring is likely of “very limited value for human exposure assessment” (*p.90 L 10-11*). As an alternative approach, Dr. Spear suggested that resources be focussed on source characterization. Exposure assessment for candidates could combine the use of application site data with air dispersion modeling.

5. Currently proposed changes to the ambient monitoring program may increase the time required without improving the quality of resulting information:

The Panel learned that DPR and ARB are working together to improve monitoring programs, particularly ambient monitoring. The chief changes under consideration at this time that pertain to ambient sampling are to expand sampling to include a second season, a second high-use region, or an additional site within the highest use area, and finally to extend the time period for ambient monitoring (*p.76 L 10-p.77 L5*). The Panel noted that these changes might not address the issues discussed above in findings #3-4. DPR is considering supplementing air monitoring data with computer modeling, consistent with the suggestion of Dr. Spear, above (*p.76 L 9-15*). Other ideas under consideration are to update old monitoring data for the 18 pesticides for which DPR has monitoring reports and is currently preparing risk assessments.

6. Better characterization of actual pesticide use would improve application site monitoring results:

A chief concern raised about application site monitoring was whether the application events that are monitored represent typical uses, or whether they might result in biased data (*p. 41, L 4-6; p. 42, L 5-11*). As with ambient monitoring, the Panel found that DPR and ARB do not routinely consult the PUR databases after monitoring is complete to verify that application conditions were representative, and that there may be uncertainty about the actual application conditions during monitoring (*p. 43 L 14-18*).

7. Technology to sample and analyze multiple pesticides is available:

The Panel learned from the invited expert from USGS about a method to sample for multiple pesticides (48) with one sampling device. Both the vapor phase and particles are trapped and analyzed. The method has been applied to ambient air in Sacramento and appears to have detection limits as sensitive as those required by DPR for at least some cases. In particular, the

Panel notes that the speaker stated that his method has very good trapping efficiency and recovery for twelve organophosphate insecticides, many of which are candidate TACs. Some of these compounds have been detected in ambient air in Sacramento by USGS (*pp. 109-111*).

In a follow-up workshop session, DPR staff presented to the Panel three alternative approaches to group pesticides for multiple sampling: by crop of highest use, chemical family, or county and month of highest use. At this point, the grouping approach is exploratory; DPR staff are considering in which cases multiple sampling strategies will prove most useful, and consulting with ARB to identify which combinations are technically feasible.

Recommendations of the Panel:

1. DPR should consider basing exposure assessments for TAC listing documents on application site monitoring results only:

The Panel recommends that DPR address the limited utility of the current ambient monitoring approach for identifying pesticides as toxic air contaminants. The Panel recommends that, for TAC listing purposes, resources be focused on application site monitoring. Ambient monitoring would still be important for risk management purposes. (Discussion of these issues on *p. 80 L 11- p.81 L 10; p.81 L13 –p.82 L6*). This line of thinking was also suggested by Dr. Robert Spear from the University of California who recommended that measurement resources be focused on “source characterization” (*p. 91 L 7-15*). In the context of pesticide air contamination, source characterization means emissions from application sites. Application site data could be input to air dispersion models to generate predictions of ambient concentrations downwind from application sites (*p.91 L19- p. 92 L8*). DPR staff also indicated their interest in using air models to supplement the collection of measured data (*p.77 L12-15*).

2. DPR and ARB staff should consider enlisting assistance from the University of California in developing a new monitoring strategy:

Dr. Robert Spear, the expert from the University of California invited to address the statistical issues in sampling strategies, offered to meet informally with ARB and DPR staff to offer advice on changes to the current monitoring strategy. The Panel recommends that his offer be pursued.

3. Computer modeling may be an important tool for developing exposure assessments:

The Panel supports the suggestions of DPR staff and Dr. Spear from UC Berkeley concerning the use modeling approaches in developing estimates of population exposure to pesticides. Air dispersion models are available and could be applied to predicting exposures for risk assessment and/or risk management purposes.

4. DPR should consider using controlled applications for some application site monitoring:

The Panel considered options for improving the utility of application site monitoring that included sampling during applications controlled by DPR staff. Two possibilities were raised. First, application a known quantity and formulation of the pesticide of interest, designed to mimic typical use conditions, could be done at a DPR “test site” (*p.43 L 19-24*). This plan would save the time and effort involved in identifying monitoring sites, and would reduce uncertainty about how much pesticide is actually applied during sampling. The second scenario DPR and

ARB might consider would involve recruiting professional applicators to carry out an application desired by a grower/farmer (*p. 44 L 20-25; p. 45 L 20-22; p. 49 L 7-15*). By working with the grower and the applicator to design the application, the uncertainties discussed in finding # 6 could be reduced.

5. DPR should supplement all monitoring data with follow-up characterization of actual application data from the Pesticide Use Reports:

To improve the utility of the data collected in both application site and ambient monitoring, and to reduce uncertainty, actual pesticide use data submitted to county agricultural commissioners should be consulted (*p. 26 L 2-11*). The PUR data can be used to better characterize the monitoring data collected, including verifying how representative the measured data are of typical uses (*p.42 L 23 – p.43 L 6*). ARB staff indicated that it would be possible to collect after-the-fact pesticide use and meteorological data that might provide important contextual information for monitoring results (*p.22 L 4-8*).

6. ARB should consider expand the use of multiple pesticide sampling in the future:

The Panel suggests that future directions in air sampling for pesticides should consider multiple sampling methods wherever possible. The Panel notes that ARB has taken advantage of simultaneous sampling in some cases (*e.g. p. 71 L 2-6*), and recommends that ARB continue to investigate available technologies for sampling multiple pesticides, to determine whether they could be adapted for use in the TAC program. Single samples able to detect multiple pesticides, such as the methods discussed by the USGS speaker and those described by ARB for bifenthrin and propargite (*p.73 L 3-5*) would be the most resource-efficient approach. To design an effective framework for monitoring multiple pesticides, a collaborative effort between DPR and ARB is needed. The Panel recommends that DPR continue the work presented in the follow-up workshop session on November 17, 1999, to explore useful scenarios for monitoring several active ingredients during the same sampling (*11/17 p. 24 L20 – p. 25 L 8*). An effective plan will account for risk assessment priorities and technical feasibility of sampling. DPR staff suggested reporting back in early 2000 with an update on multiple sampling approaches (*11/17 p.25 L3-8*).

7. A clear rationale for selection of pesticides for monitoring should be included in the new process for prioritization (recommendations #1 and 3 under prioritization).

The Panel recommends that, as DPR is addressing the concerns raised above in prioritization of pesticides for risk assessment, a rationale for the approach by which pesticides are selected for monitoring be developed.

Conclusion

The Panel is enthusiastic about the discussions that took place at the workshops, and is hopeful that the Findings and Recommendations outlined here can contribute to the development of an improved, more efficient process for identifying pesticide toxic air contaminants. The Chair of the Panel will appoint Panel member leads and/or a technical liaison to assist with implementation of any of the recommendations made here, if ARB or DPR should request such assistance.

SRP Workshop: Pesticides in the Air
September 16-17, 1999 at the South San Francisco Conference Center

PART A: Prioritization of pesticide Toxic Air Contaminant candidates

Workshop Aims: To clarify for the panel the process by which pesticide TAC candidates are prioritized for development of TAC documents. What criteria are used, how often is the priority list updated, and what is the resulting list of compounds at this time? Other topic of interest include how prioritization under AB1807 and SB950 programs is coordinated and how pesticides are prioritized for risk assessment in the relevant offices at the USEPA.

Proposed Agenda:

1. Prioritization of pesticides for tolerance reassessment, and current status of pesticides in the program. Presenter: Luis Suguiyama, Branch Chief for Fungicides, Registration Division, Office of Pesticide Programs, USEPA. (40 min)
2. Prioritization of pesticidal toxic air contaminant candidates by the Department of Pesticide Regulation (DPR), and current status of the priority list. Presenter Paul Gosselin from DPR. (40 min)

Further questions for discussion

- What are the similarities and differences in the prioritization approaches used by the Air Resources Board (ARB) and DPR for 1807 candidates?
- How are pesticides prioritized by DPR under SB950? Within the high priority group, what process governs selection? Health risk characterization documents developed for SB950 pesticides are incorporated into TAC candidate documents; what is the policy on coordination of the prioritization schemes for the two programs?
- DPR's prioritization document, EH96-01, indicates that the ranking scheme will be periodically updated; the next update is slated for 2000. Is there a need for more frequent updating? For example, how would the priority order change if average use/sales over the period from 1995-1997 were substituted for the 1990-1994 average used in the 1996 document?
- Could prioritization of pesticides be modified to address priority groups of compounds in addition to individual pesticides?
- Could the risk assessments of organophosphate pesticides coming out of the FQPA processes provide a basis for expedited assessments of the five OPs that are in the top 20 of DPR's priority list (fenamiphos, chlorpyrifos, dimethoate, methidathion, and diazinon)? What is the status of monitoring for these compounds?

PART B: Air Monitoring for Pesticides

Workshop Aims: To clarify for the panel the current sampling strategy used to collect data for use in assessing exposure to pesticide candidate TACs, and to discuss the scientific framework for proposed changes to the monitoring plan that are being considered by a team from ARB and

DPR. Available technology for concurrent sampling for multiple pesticides, scenarios in which multiple chemical sampling might be economically and/or scientifically advantageous, and the limitations to the methods will also be discussed.

Proposed Agenda:

1. Current monitoring requests and protocols: how are locations, sampling time, and sampling duration selected? What is the history and status of monitoring requests for pesticide TAC candidates (when initiated, when sampling was done, final report date, etc.)? *Presenters: DPR and ARB staff. (40 min)*
2. Changes to the current practice being considered. *Presenter: ARB/DPR staff. (30 min)*
3. Update on current monitoring projects. *ARB staff. (20 min)*
4. Scientific issues in design of air pollution sampling strategy: how do factors such as variability in time and space of pesticide use and the purpose of the monitoring data (e.g. exposure assessment for acute versus chronic health endpoints) impact the statistical properties of the data that result from particular sampling approaches? How can sampling strategies be optimized for the desired health risk assessment purpose? *Presenter: Bob Spear, Professor of Environmental Health Science, UC Berkeley. (30 min)*
5. Sampling for multiple pesticides: What is the current availability of methods for multiple pesticide sampling? What are the technical limitations? Would the costs of the TAC monitoring program be affected if sampling at a particular location/time included measurement of all pesticides being applied? *Presenter: Mke Majewski, USGS. (30 min)*
6. Case study to assess prospects for multiple sampling: cotton. *Presenter: DPR staff. (20 min).*

Further questions for discussion:

- What is the monitoring status of the pesticides on the TAC priority list and what is the average turnaround time between the first request for monitoring from DPR to ARB and the time a final report is available for use in exposure assessment? What are the major obstacles DPR and ARB encounter in completing monitoring for exposure assessments of priority compounds?
- How is it decided when inert ingredients breakdown products or products of atmospheric chemistry should be included in the monitoring plan?
- What avenues are available for DPR to request monitoring for a pesticide that is on the federal hazardous air pollutant list? For example, telone use has increased in recent years; can monitoring be conducted under the TAC program?
- Because pesticide applications cannot be accurately predicted, could DPR follow up monitoring for ambient exposures with assessments of pesticide use data and meteorological records pertinent to the sampling periods? This could provide important contextual information for interpretation of the monitoring results.
- What are the key scientific or technical issues that the staff working on updating the monitoring plan want to bring up for discussion?

- The concentration of pesticides in the air is highly variable in both time and space. What statistical considerations should guide development of sampling strategies so that the resulting measurements can best capture different sources of variability in airborne concentration? How much flexibility in guidelines is needed to address case-by-case differences in variability?
- Since sampling and analysis methods need to be developed for most of the candidate pesticides, is it possible to develop multiple sampling protocols for some crop areas? What situations would most benefit from sampling for more than one pesticide? For example, for scenarios in which several OPs or other high priority pesticides are being used simultaneously, would it be practical to collect the data for the group of compounds simultaneously?
- If budgetary constraints allowed, are there particular pesticides or application scenarios for which personal monitoring surveys would be particularly important?